Ethanol. Powering our future.

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Manitoba's homegrown energy source.

As part of Manitoba's commitment to take action on climate change, 85 per cent of gasoline sold in our province will contain made-in-Manitoba ethanol. Increased use of ethanol will reduce greenhouse gas emissions — that's good for our environment. Increased local production of ethanol reduces our need for imported fuel and provides farmers with new markets for grain — and that's good for our economy.

Ethanol is perfectly safe for use in any car, truck or motorcycle built since the early 1970s. All manufacturers approve, and many actually recommend the use of ethanol-blended gasoline. It does not damage engine parts and may even improve the performance of your vehicle. Ethanol is a very clean-burning fuel that reduces buildup and helps keep engines running smoothly. It also works much like gas line antifreeze so it's great for Manitoba winters. At the pump, drivers will pay no more for ethanol-blended fuel than they would for regular gasoline.

Transportation is the largest source of Canada's greenhouse gas emissions. A 10 per cent ethanol blend reduces a vehicle's emissions of greenhouse gases and other pollutants by an average of 25 per cent. Replacing a portion of Manitoba's gas with ethanol will cut annual greenhouse gas emissions by up to 130,000 tonnes — the equivalent of taking 10,000 vehicles off the road!

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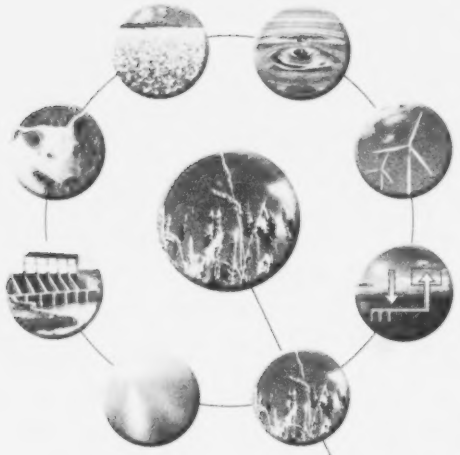
Increased ethanol production has far-reaching benefits for Manitoba's economy. Ethanol industry expansion will boost the construction industry in rural Manitoba. In addition, ethanol production will create long-term employment for plant workers.

Ethanol production will strengthen the local market for grain. Approximately 420,000 tonnes of wheat will be needed to produce 140 million litres of ethanol for the Manitoba market — and a growing export market is expected to create even more demand. Since a co-product of ethanol production is distillers' grain, livestock producers will have access to a competitively priced, high-protein alternative to imported feed.

The co-products of ethanol production have only just begun to be explored. Research and development is revealing the future potential of other value-added products, such as pharmaceuticals, nutriceuticals and functional foods.

Food For Thought: In the ethanol production process, only the starch portion of the grain is converted to ethanol. The protein portion goes back into the feed mix.



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Ethanol is one of many alternative energy initiatives currently being explored in Manitoba. Our province is rich in renewable resources and has the potential to become an international leader in the development of clean energy.

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Contact Manitoba's Ethanol Office for more information.
Ethanol Fact Sheets are available on the following topics:

1. **The Facts About Ethanol and Automobile Engines**
2. **The Facts About Ethanol and the Price at the Pump**
3. **The Facts About Ethanol and Small Engines**
4. **The Facts About Ethanol and the Environment**
5. **The Facts About Ethanol and Energy Balance**
6. **The Facts About Ethanol Feedstocks**

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The Facts

About Ethanol and Automobile Engines

Will using ethanol-blended fuel affect vehicle warranties?

Not at all. Ethanol has been in use since 1979. Back then, auto manufacturers tested it and accepted the use of a 10 per cent ethanol blend. Today, all manufacturers approve it for warranty, and some actually recommend the use of 10 per cent ethanol-blended gasoline.

Is there a difference between ethanol and methanol?

They sound similar but it's important to know that they are completely different! Methanol or methyl alcohol is fuel made from a variety of fossil fuel sources including coal and natural gas. Ethanol is fuel made from renewable crop sources. Methanol-blended gas is not approved for warranties, while ethanol-blended gas is.

Will ethanol burn valves?

No. Since ethanol burns cooler than gas it certainly will not burn valves. In fact, many high-powered racing engines use pure alcohol fuels for that reason.

Older engines designed for leaded gas experienced valve problems when lead was being phased out, because their non-case-hardened "popet" style valve seats needed the extra cushion lead oxides provided. But those problems weren't caused by the presence of ethanol — they were caused by the absence of lead.

Ethanol is a biodegradable liquid alcohol distilled from plant matter, such as wheat or corn. It is used in vehicles as fuel, a fuel additive or fuel extender. As part of Manitoba's commitment to take action on climate change, 85 per cent of gasoline sold in our province will contain made-in-Manitoba ethanol.

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Is ethanol OK to use in fuel-injected engines?

Absolutely. Ethanol is fine for any type of engine. Port fuel injector burning or fouling is caused by components of gasoline, such as olefins, that cause deposits. Ethanol has never caused injector problems. As well, since 1985, all ethanol blends, and nearly all other gasoline, have contained corrosion inhibitors and detergent additives that have been very effective in preventing injector deposit problems.

Does ethanol cause plugged fuel filters?

No. Contaminants and residues in some gasoline cause plugged fuel filters. But ethanol works to clean your fuel injection system. So it's a good idea to change your fuel filter after the first tank of ethanol, because the cleared residue can accumulate in the filter. After that, ordinary maintenance is all that is required.

Does that mean ethanol is good for vehicle engines?

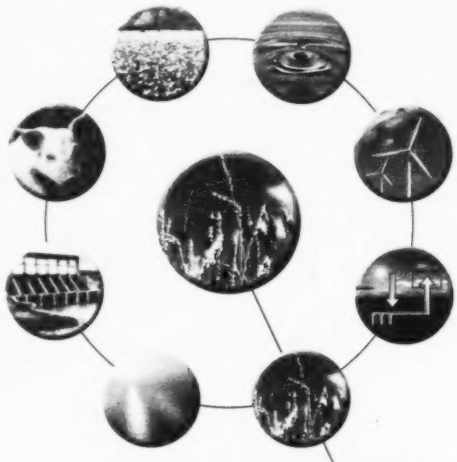
Ethanol is a very clean-burning fuel that reduces buildup and helps keep engines running smoothly. Ethanol is also an octane enhancer, boosting the octane in your fuel by two points.

When using ethanol, is gas line antifreeze necessary?

No. That's another advantage. The alcohol content of ethanol-blended gas effectively absorbs condensation. It actually eliminates the need and expense of adding gas line antifreeze — so it's great for Manitoba winters!

Why do some mechanics advise against using ethanol?

When cars have fuel system problems, some mechanics will wrongly assume that ethanol-blended gas is the cause because they simply lack the correct information. With expanded use of ethanol and more available information, this perception will undoubtedly change.



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The Facts

About Ethanol and the Price at the Pumps

Will ethanol-blended gasoline cost more than regular gasoline?

No. After the federal and provincial ethanol tax credits are applied, the cost of ethanol to marketers will be about the same as regular unleaded gasoline. In some markets, ethanol is found only in high octane gasoline, which is higher priced — this has contributed to the perception that ethanol will be more expensive. But in fact, Manitoba drivers will not pay more at the pumps than they would for regular gas.

If the price of wheat goes up, will this increase the price of ethanol-blended gasoline?

We have all experienced fluctuations in gas prices due to volatility in the oil market. Both oil and wheat prices will go up and down as markets shift, and both will have an impact on the price at the pump. But since Manitoba's ethanol-blended gas will contain only 10 per cent ethanol, shifts in wheat prices will have less impact than shifts in oil prices. It is even possible that low wheat prices may help balance high oil prices and vice versa. As well, since only the starch portion of the grain is converted to ethanol, the unused portion can be sold as valuable livestock feed, offsetting the price of production.

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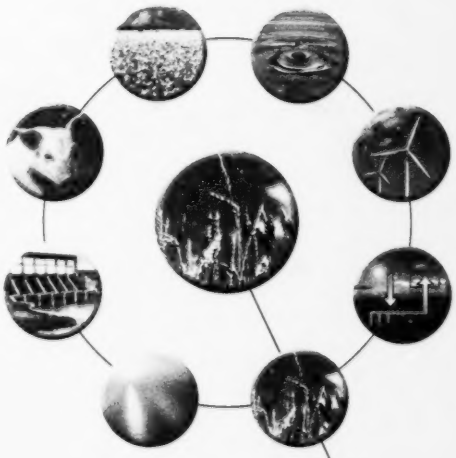
Will ethanol production costs decrease over time?

Most certainly. Both the environmental impact and monetary cost of ethanol production is constantly improving. Expanded use of ethanol-blended gas will greatly accelerate advancements in production technology. When the conversion of cellulose to ethanol is perfected, the cost of ethanol production is expected to decline drastically. This is because perennial fibre crops and solid waste can then be used to produce ethanol instead of wheat.

Direct production costs aside...

Importing oil adds to our trade deficit while producing ethanol creates jobs and adds value to grain. Growing grain for ethanol production produces oxygen while burning gasoline harms the environment and creates pollutants which increase health care costs.

So, looking at the big picture, the cost of ethanol production is more than offset by the benefits to our environment and economy as a whole.



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The Facts

About Ethanol and Small Engines

Can ethanol be used in ATVs, chainsaws, outboard motors, etc.?

Yes. All major manufacturers of motorcycles, snowmobiles, outboard motors and power equipment (lawn mowers, weed whackers, chainsaws) permit the use of ethanol in their products.

Has ethanol been tested in small engines?

Yes. Many tests have been conducted comparing the performance of ethanol-blended gasoline with unleaded gasoline in small utility equipment and in outboard motors. The most significant difference was that the engines using ethanol had slightly fewer carbon deposits. Recent outboard motor tests conducted by the Detroit Lakes Technical College in Minnesota concluded that the minimal amount of water an ethanol-blended gasoline absorbs from the atmosphere should not be of any concern.

Why do some outboard motor owners' manuals say not to use it?

Probably because they haven't been updated since ethanol first came into use. When those cautionary statements were first included in outboard motor manuals, ethanol was often confused with methanol (a totally different type of fuel). As well, there was concern about the quality control of ethanol production because it was so new. Now, production standards are well established, so the quality of ethanol is no longer a concern.

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Will phase separation become a problem?

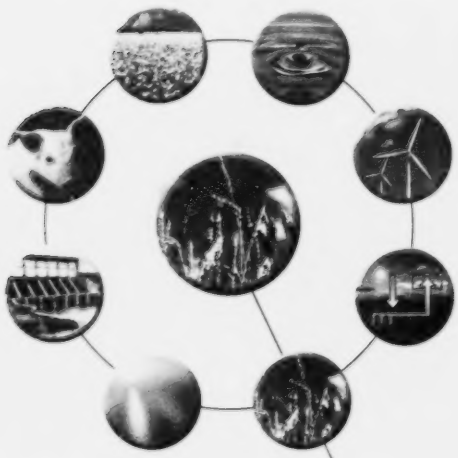
When a 10 per cent ethanol blend is contaminated with over .5 per cent water, the ethanol and water will separate from the gasoline and fall to the bottom of the gas tank. This is an inconvenience because the fuel system must be drained and new fuel added. So, before using ethanol-blended fuel for the first time in an older small engine, it is recommended that all water be removed from the tank. Since water in the fuel system can cause carburetor problems, it's a good idea to keep water out as part of responsible engine maintenance. Continuous use of an ethanol blend can help prevent water accumulation, protecting against avoidable repairs.

Will two-cycle oil separate from ethanol?

No. Properly mixed, all approved two-cycle oils will remain in solution with an ethanol-blended gasoline.

Does ethanol cause gasoline to go bad in storage?

Absolutely not. Storage problems are primarily caused by important storage conditions and some of the chemical components of the gasoline itself, not ethanol. It's never a good idea to store any gasoline longer than a month or two — and it certainly should not be carried over from one season to the next. Seasonal equipment tanks should be run dry at the end of the season, before it's time for storage.



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The Facts

About Ethanol and the Environment

How much difference can ethanol use make to the environment?

- Mandating the use of ethanol blends in 85 per cent of our gas could reduce Manitoba's consumption of gasoline (an imported fossil fuel) by up to 160 million litres annually.

- Replacing 10 per cent of gas with ethanol reduces a car's greenhouse gas emissions by 5 per cent and reduces carbon monoxide from the tailpipe by up to 25 per cent. It also reduces emissions of particulates (which cause many respiratory ailments) by 25 to 32 per cent and displaces some of the toxic gasoline components such as benzene, a carcinogen.

- In Manitoba, greenhouse gas emissions could be reduced by over 135,000 tonnes per year — the equivalent of taking 10,000 vehicles off the road!

What are the long-term environmental benefits?

Ethanol has received the ECO-LOGO designation from Environment Canada, recognizing its environmental benefits over conventional gasoline.

Transportation is the largest source of Canada's greenhouse gas emissions. Expanded use of ethanol will slow the destruction of our environment from climate changes due, in large part, to greenhouse gas emissions.

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Air pollutants, which affect people's health, will be reduced by ethanol use. The American Lung Association of Chicago credits ethanol with reducing smog-forming emissions in the city by 25 per cent since 1990.

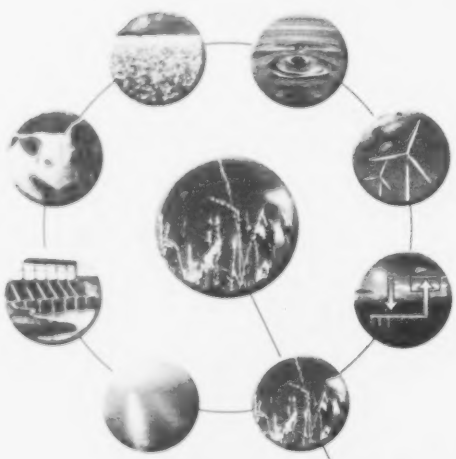
Using ethanol is good for the environment, but what about producing it?

Many of the concerns about the environmental impacts of ethanol production are outdated, or incorrect.

The Manitoba government has initiated an incentive system encouraging state-of-the-art energy efficiency in new ethanol plants. Manitoba-made ethanol will result in 44 per cent more energy gained than is required to produce it. And modern production techniques cut, and in some cases eliminate, particulates released during ethanol production.

Significant improvements in production processes over the last 20 years mean producing ethanol requires far less fresh water than it used to. A modern, 80-million-litre plant is expected to use less water than a plant built 20 years ago that is one-eighth the size.

According to a recent Natural Resources Canada study, because Manitoba ethanol plants are powered by renewable hydroelectricity, Manitoba ethanol will be the cleanest, grain-based ethanol in North America.



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The Facts

About Ethanol and Energy Balance

Does ethanol generate more energy than is used to produce it?

Yes. A February 2003 study by Natural Resources Canada shows Manitoba ethanol, produced from wheat, has a positive energy balance of 44 per cent. This means there is 44 per cent more energy provided by ethanol than it takes to make it. This data includes all energy inputs — from sowing the seed in the ground to pumping ethanol into the gas tank.

Dozens of studies from around the world support this conclusion. The actual balance varies from place to place, and from feedstock to feedstock, but the positive energy balance remains a constant. With ethanol plant technology and wheat production efficiency (higher winter wheat yields with less input) constantly improving, energy balances will continue to improve as well.

What about the U.S. studies that claim it takes more energy to produce ethanol than is gained from it?

These U.S. studies, primarily from one researcher, use outdated numbers for the energy required within the plant to convert corn to ethanol — these numbers do not reflect the efficiencies of modern facilities. The studies also use extremely low corn yields and the highest fertilizer application rates of all major studies. Furthermore, they do not reflect the many efficiencies in farming practices that would affect the overall energy balance. One significant factor is the use of higher yielding, lower input crops, such as winter wheat.

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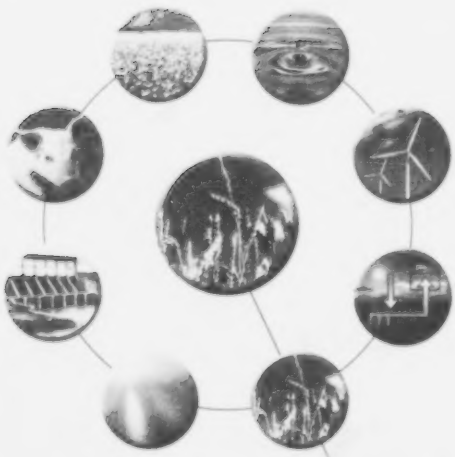
Are these U.S. studies applicable to Manitoba ethanol production?

For the most part, no. Manitoba ethanol production plants are powered by renewable hydroelectricity, while U.S. data is based primarily on the use of fossil fuel. Because of our province's clean, renewable hydro power, Manitoba-made ethanol has a greater positive energy balance than most. Manitoba ethanol is considered, by Natural Resources Canada, to be the cleanest grain-based ethanol in North America.



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The Facts

About Ethanol Feedstocks

Is there enough wheat to supply increased ethanol production in Manitoba?

Yes. Over the last 10 years, Manitoba has produced between 3.2 million and 5.9 million tonnes of wheat annually. Manufacturing 140 million litres of ethanol a year would require 420,000 tonnes of wheat — or just 7 to 13 per cent of what is already being produced.

During public consultations, farmers expressed a willingness to grow higher yielding wheat, particularly suited to ethanol production. Manitoba Agriculture and Food will be testing numerous high-yielding varieties in the future.

Canada has a surplus of grain. Today, some farmers are losing their businesses because large surpluses have led to low crop prices. Ethanol provides farmers with an opportunity to add value to crops within their community and be more profitable.

Will ethanol production drive up the cost of wheat and adversely affect the livestock sector?

Actually, ethanol production will benefit both wheat and livestock producers. Increased demand will likely increase the price of wheat marginally — that's a good thing for Manitoba farmers suffering from years of depressed grain prices. In the U.S., studies show that corn prices are about 10 cents a bushel higher in areas near ethanol plants.

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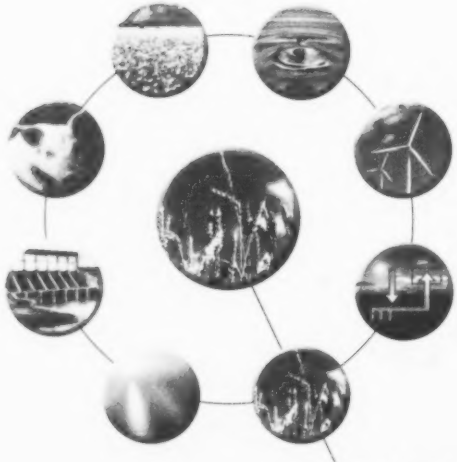
Marginally higher wheat prices should not have a negative impact on the livestock sector. In the ethanol production process, only the starch portion of the grain is converted to ethanol. The co-product, distiller's grain (DG), is a valuable, high-protein livestock feed. Having access to local DG can be very good for livestock producers, who currently import over one-quarter million tonnes of soybean meal a year at premium prices. This locally produced DG will mean significant savings to livestock producers.



Will using wheat to produce ethanol negatively affect our food supply?

Canada actually has a surplus of grain — unfortunately, people in the world suffer from hunger not because there is a food shortage, but because of economic, political and transportation barriers.

In most cases, ethanol plants use feed crop varieties, cracked corn or wheat, not suitable for human consumption.

In the ethanol production process, only the starch portion of the grain is converted to ethanol. The co-product, distiller's grain (DG), is put back into the food chain as livestock feed. And research is currently being conducted into using DG as a human food source.

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